

**DELAWARE RIVER BASIN COMMISSION
FLOOD ADVISORY COMMITTEE SUMMARY**

February 6, 2008

The February 6, 2008 Flood Advisory Committee (FAC) meeting began at 10:00 AM at the Commission office (DRBC) in West Trenton, NJ. Scott Steigerwald of the Pennsylvania Department of Environmental Protection (PADEP) chaired the meeting.

A. Introductions and Review of the Draft Minutes from the November 7th Meeting

The minutes were approved without any changes or corrections. The summary will be posted on the DRBC web site. Tapes of the meeting may be reviewed upon request.

Mr. Steigerwald announced that Vidal Martinez is the new superintendent of the Upper Delaware Scenic and Recreational River, following Dave Forney's retirement.

Bill Winslade, Yardley Borough manager and emergency management coordinator, has agreed to join the FAC and fill the vacant membership slot for a Pennsylvania local emergency manager. Formal action will be taken at the upcoming May meeting.

B. Hydrologic Conditions Report

Hernan Quinodoz, DRBC, gave a brief hydrologic conditions report. Over the past five days, 100% to 200% above normal precipitation was seen mostly over the northwest and the upper basin. This area had one to two inches above normal. The flash flood guidance average value per county in the upper part of the basin is 2-2.5 inches, and 1-1.5 inches in the lower part of the basin.

The precipitation forecast over the next one to three days shows 1-2 inches mostly in the upper basin, and <1.5 inches for the lower basin. The snowpack water equivalent, as of February 5th, was 0.5-1.0 inches in the upper basin. February 2nd was the most recent rainfall event that produced fairly saturated conditions throughout the basin. As of February 6th, most of the gages were at or above the 80% exceedance discharge.

There is an approximate 21 bg void out of the 271 capacity in the three NYC reservoirs. The void is a result of the program that has been having larger releases when the combined storage is above 95%. Today, Cannonsville is releasing 250 cfs because it just dropped below the 95% line, but it was releasing at 1,500 cfs a couple days ago.

C. Update on the Flood Project of the Nurture Nature Center in Easton, PA

Jane Stanley, director of the Nurture Nature Foundation gave an update on the status of the Flood Project. Ms. Tessieri and Mr. Rupert of DRBC helped to organize a group tour of the facility for approximately 25 individuals on January 22nd. The tour provided an opportunity for many FAC members to see the building and discuss its potential in advancing flood education, flood warning and mitigation. Two messages came out of the meeting. The first is the need for a strategic plan for participating agencies to review. The second is the need to brainstorm about the structure and roles that participating agencies would play. Nurture Nature has had follow-up meetings and conference calls with many who attended that first meeting.

Nurture Nature has approached Bob Hainly, USGS, about the possibility of an outreach exhibit. They also met with NRCS, and were able to identify things to do together that would be very economical budget-wise to enhance the flood education efforts. In addition, Mr. Ahnert and Mr. Szatkowski brought NOAA's Science on a Sphere educational outreach exhibit to their attention. It may be possible to apply for a funding opportunity through NOAA for a K-12 education grant that would install the Science on a Sphere and have an educational component met through Lehigh University's involvement.

D. New Gages and Cameras on Delaware Bridges: Presentation by the Delaware River Joint Toll Bridge Commission (Frank McCartney, Delaware River Joint Toll Bridge Commission (DRJTBC))

The DRJTBC is a bi-state compact agency that currently operates seven toll bridges and thirteen non-toll bridges crossing the Delaware River between Pennsylvania and New Jersey. The 20 bridges span from the Trenton/Morrisville Route 1 toll bridge up to the Milford-Montague toll bridge. DRJTBC has been involved over the last eight years in developing and implementing a \$950 million capital improvement program to preserve, protect and enhance their crossings. In addition, they have been working with local communities through their compact authorized investments to provide transportation infrastructure grants to improve facilities, park & rides, trails, and traffic lights.

In the last 4-5 years, they have been working to deal with the successive flooding along the Delaware. Up until 2005, the DRJTBC operated manual river gage monitoring, in which the bridge officers who are stationed on many of the toll-supported bridges go out in the midst of the storm and record high water river gage measurements. In 2005, through an arrangement with the USGS New Jersey Water Science Center, the DRJTBC began installing radar-operated river gages on their bridges. USGS operates and maintains the gages while the DRJTBC is responsible for covering the costs for installation, electricity and telecommunications. The gages record the river readings every 15 minutes and transmit the data hourly via satellite or modem to the USGS. Each modem is capable of dialing out to four distinct numbers. The FAC might want to make suggestions as to how best to utilize that additional call-out capability. You can monitor the readings on the AHPS site. The final installation is scheduled for the Washington's Crossing Bridge.

In addition to the gages, DRJTBC is installing electronic surveillance and security systems on their bridges and facilities. The DRJTBC was awarded a contract in the late summer/early fall of 2007 for \$21 million to install cameras, motion sensors and monitors on all bridge facilities up and down the river. The cameras will also be utilized on a real-time basis to monitor activity along the river, particularly during high flows. They will be able to identify issues such as debris in the river, propane tanks floating down the river, etc. If there is remedial action that can be taken, they will work with the New Jersey state police who are under contract with PA and NJ to provide security on the bridges. That system will be up and running within the year, at least on the five busiest bridges. Within 18 months, it will be active on all facilities.

Mr. Ahnert asked if there was any chance that periodically this feed would be available on their website so other agencies, like the NWS, could monitor river conditions. Mr. McCartney said yes, he thinks those capabilities are there. Mr. McKillop asked if they plan to take the camera output and get it posted outside of their system or is it going to stay internal. Mr. McCartney responded that for security purposes, it is internal. During flood conditions, though, they could establish a memorandum of understanding with other agencies for them to have access to the images.

E. Update on Status of Automatic Snowpack Monitors in the NYC Watershed

In 2006, DRBC received \$22,000 through NOAA's automated flood warning system grant program to buy two automatic snowpack monitors for installation in the NYCDEP watershed. Soon after receiving the grant, NYCDEP found that the antifreeze used in the monitors to determine snow water equivalent leaked in some instances, so they discontinued that type of monitor. DRBC held the funding while trying to figure out if there was a new type of sensor that could be used. NYCDEP was aware that Jerry Johnson from the Army Corps of Engineers in Fairbanks, Alaska developed an electronic load type sensor. DRBC was able to get two of these electronic load type sensors using the grant funds. Both were recently delivered to NYCDEP. NYCDEP is responsible for installation, maintenance and telemetry. The first meter was just installed in the Neversink watershed and the second will be installed in Pepacton. These monitors are expected to supplement manual snow surveys working towards easier, quicker and more accurate snowpack data collection.

F. Discussion of an Ice Jam Communications Plan for the Delaware River

Scott Steigerwald stated that this topic was already discussed in Mr. McCartney's presentation. No further discussion was needed.

G. Report on the June 2007 Flash Flood Event in the Headwaters of the Beaver Kill, NY

(Michael Schaffner, Senior Service Hydrologist, NWS – Binghamton Weather Forecast Office)

Mr. Schaffner gave a presentation on the June 19th, 2007 flash flood that occurred in the tributaries of the Upper Beaver Kill. This flood resulted in four fatalities and a minimum of \$20 million of damage to public infrastructure. Multiple bridges were destroyed, four homes were completely washed away, six homes were severely damaged, and an additional 14 homes had various degrees of minor to moderate damage.

On the morning of June 19th, there were severe thunderstorms with reports of hail and heavy winds. As the day went on, the wind sheer increased allowing the storms to organize better and be better producers of heavy rainfall. Once the storms got anchored, they regenerated over the higher terrain. For a period of about three hours, the storms continued to train and redevelop over the same location. The basins that were affected were upper, middle and lower Spring Brook and Berry Brook, tributaries to the upper Beaver Kill.

Rainfall reports of 11 inches and over were reported in the lower portion of Spring Brook. If you compare these reports with the radar, it appears that the radar was underestimating this event. The radar indicated that a 3-hour 100-year rainfall had occurred during this event. This is approximately equal to the 24-hour 100-year rainfall being squeezed into a three-hour time span. Multiple eyewitnesses in the lower portion of the basin reported a "wall of water". This occurred from debris dams that were breaking behind bridges in the lower portion of Spring Brook. Communications were taken out in the storm relatively early because it was a severe weather event with high winds estimated at up to 60 to 70 mph, and large hail. This made the dissemination of warnings very difficult.

At Berry Brook, a simple slope conveyance taking one cross-section of the channel using the slope from the USGS topographic map was performed. The cross-section was estimated to be about 213 square feet for the main channel, 138 square feet for the right bank overflow channel. They came up with a slope conveyance discharge of 2,771 cfs, which is greater than the five-year flow. Along the Beaver Kill, there was a 5.4 foot rise or about 5,000 cfs. The USGS crest gage came in with a recorded peak of 10.16 feet or about 9,900 cfs. The inflow into Pepacton peaked at about 15,959 cfs at 9:40pm the evening of the flash flood, the outflow was about 156 cfs, so the reservoir did not spill. The dam helped to prevent minor to moderate flooding in Harvard and downstream.

There were several days of extremely muddy and turbid water from the upper Delaware to the Bay. Most of that sediment probably came from Spring Brook, Berry Brook, and Pelnor Hollow; the three small watersheds in the upper portion of the Beaver Kill that got the majority of the heavy rainfall. The USGS reports that there is a lack of sediment monitoring in the upper portion of the Delaware and, in particular, the Beaver Kill watershed.

Mr. Nechamen said a lot of the areas that were in the headwaters are not typically on any FEMA maps due to the small drainage area. Because of that and because they are typically small bubbling brooks, people often have a false sense of security. Ms. Schultz raised the issue of zoning ordinances to prevent poor land use decisions in the future, as well as, the need for an assessment of risk for the existing houses. Mr. Schaffner said they had been in contact both with the counties and the towns and gave a presentation to the town of Colchester following this event. Mr. Tamm said this storm was greater than a 500-year event and asked if communities are going to be planning to that risk management goal. Mr. Nechamen said he thinks in Rockland they are talking about adding some stream buffer zones. Rather than doing a scientific investigation, they just make sure they are a certain distance from the stream. Mr. Nechamen said in these mountainous areas you often have got a small area to build so you cannot eliminate development completely, but a buffer may be one measure to implement.

Mr. Zagone asked why there was a difference between the radar and actual conditions. Mr. Schaffner said one reason is that there was a fair amount of hail with this storm; it was not a pure rainmaker, which tends to throw the radar off. Mr. Ahnert said radar, by its very nature, is remotely sensed and the rainfall estimates are highly dependant on raindrop size; they assume a typical drop size distribution in the storm. When you have an atypical storm, it has an atypical drop size distribution so you now have an increase or decrease in energy reflected back from the drops, resulting in rainfall estimates that are too high or too low. The other issue is terrain. When you have terrain, the radar is sensing five to six thousand feet above the terrain, and the enhancement of the rainfall caused by the terrain often occurs close to the ground. So, you can get heavier terrain enhanced precipitation that the radar does not see. Mr. Ahnert added that is why USGS and other rain gages are so essential. The rain gages are used in the river forecasting process to adjust the radar upward or downward. Forecasters make real-time comparisons between the rainfall the rain gages are measuring and what the radar is reporting.

Mr. Martinez asked if they could expand on the consideration for more sediment monitoring in these areas. Mr. Tudor said he believes the USGS had the capacity to do this in the past, but they do not have it to date due to budget constraints. USGS, NOAA and EPA are cooperating on a national water quality design. Even though this very extreme event occurred in a very small portion of the basin, it had a giant ripple affect that cascaded all the way down the river into the bay and out into the ocean. If you look at a satellite image of the basin at that point in time, you could see the projection of this turbid water going right out into the ocean. The Delaware Basin is one of three pilots around the country where they are trying to say what is needed in terms of capacity to monitor this system to influence bays, oceans, etc. It has been communicated that they need to revisit the ability to do sediment monitoring, because it does have impacts to bays, oceans, etc. in addition to the local people and property issues.

Mr. Suro said that they made some proposals to DRBC about getting a couple of additional gages up above the Beaver Kill. They have been trying to get funding to get some of those gages back, and if implemented, they might be able to add sediment to it.

Mr. Zagone asked if the area impacted had a local hazard mitigation plan. Mr. Ferrari said yes, they have a county-wide mitigation plan. The issue they had in this little valley was that they had never had experienced major flooding before. Mr. Zagone expressed that this event should be used as an educational tool to make more towns more cognizant of flash flooding. Mr. Tudor suggested that the Flood Project in Easton for implementation.

H. Discussion of Potential Projects to Enhance the Delaware River Flood Warning System and Implement the Flood Warning section of the Interstate Flood Mitigation Task Force Report

Mr. Steigerwald referred to the recommendations from the Interstate Mitigation Task Force issued in July of 2007, and opened up discussion for potential projects that could enhance or advance any of the recommendations that were contained in this section of the report. Ms. Tessieri said she sees these recommendations as a blueprint going forward. There was a subcommittee conference call last fall that went into some detail about how to prioritize certain recommendations if future appropriations come along. In the FY2008 omnibus appropriations bill, there is \$235,000 for a Delaware enhanced flood warning system. Congressmen Holt and Dent, as well as Senators Lautenberg and Menendez, were particularly strong in championing this, and it is in the National Weather Service budget.

It was discussed that the stream and precipitation gage inventory is still needed to help recommend new forecasting points. Tom Suro sent a list of the gages that need to be flood hardened to withstand larger events, which totaled \$165,000. Ms. Tessieri requested other USGS offices to send lists of other gages that need flood hardening or that require rating curve extensions. In addition, it was discussed that Ms. Tessieri wanted to ensure that the flood inundation mapping the Corps of Engineers is preparing is usable with AHPS.

Ms. Cabrera said she knows there is a plan for the extension of rating curves and also the hardening. Mr. Hainly responded that they are in the process of extending those ratings where they can without much field effort. They are also going to do a survey on sites where they need additional data collected and where they are going to collect field data to produce some indirect computations of discharge, but those will not be done soon.

Ms. Colvin said all of these items reach a point where you are getting good information and good gages, monitors and sensors, but it is also really important to take a look at how you are going to communicate that information to the communities. A communication tool for local emergency managers through AHPS was mentioned. Ms. Stanley suggested that FW11 should be included in that concept. Ms. Tessieri said once the flood forecast inundation maps are prepared and instituted in AHPS, that besides the sections along the gages, there will also be maps produced all along the main stem. An extra step is needed so the county risk managers know this information is available. Mr. Tamm said he thinks they need to make a step to outreach to the emergency managers. This is an operational phase, and he will go back to Bucks, Montgomery, Philadelphia and some other counties and find out how they would like information supplied.

Ms. Colvin discussed Schoharie County, NY's reverse 911 warning system that was tied into the first digital maps that were done in Schoharie County. Mr. Nechamen said that works very well with the gaged streams, but it does not really solve the problem of some of the mountain streams where it is hard to get a warning to the public in enough time. Mr. Ahnert said the Weather Service has some RSS feeds available where you can subscribe to get river forecasts sent to your cell phone if it exceeds a certain level, and can also subscribe from various private vendors to get flash flood warnings sent to your phone, cell phone, etc. Ms. Tessieri said Laurie Hogan presented that a few meetings back, and the minutes with links to sign up for the RSS feeds are on the DRBC flood page. If anybody needs more information they can contact her.

Mr. Szatkowski said New Jersey's ROIC (emergency management operations center) is getting more into real-time weather monitoring. He signed up for it and there must be several hundred e-mail addresses on there, primarily emergency management based.

I. Opportunity for Public and Interested Party Comments

Mr. Zagone briefly discussed Governor Rendell's \$7 million to revitalize the Chester waterfront and surrounding region and mentioned that in the FAC should be aware and keep an eye on this potential for development in flood prone areas.

Mr. Nechamen mentioned that the Commissioner of the NYSDEC plans to convene a commissioner's flood task force next fall. In the short term, they are going to convene a DEC working group to try to hammer out an agenda, but over the longer term, they want to bring in some outside organizations to comment.

Mr. Steigerwald discussed Governor Rendell's budget proposal for the legislature. Infrastructure is the primary initiative this year including bridges and dam repairs. The proposal also doubles the annual budget for flood protection grants, provides funds for stream improvement projects, and makes capital funds of \$100 million available over the next three years for flood control projects.

Mr. Szatkowski said on May 8-9, 2008 the New Jersey Emergency Preparedness Association (NJEPA) is having a conference. It is mainly for emergency management, but it crosses over a lot of areas, and there is flooding in the agenda. The website for that is www.njepa.org.

Mr. Mahood reported that NRCS received their budget allocations for this year. As anticipated, no watershed planning money or watershed dam rehab funding was allocated. NRCS did receive two congressional earmarks. The first is for approximately \$2.5 million to continue buying out and elevating homes in the Neshaminy to bring it to a total of about \$15 million over the life of the project. The second is for the Tulpehocken Watershed which is a water quality improvement project that deals with agricultural runoff.

Mr. Jesperson provided an update on PA's formation of an AFSPM chapter. They had an initial meeting in November, and are hosting another meeting on March 20th near Harrisburg. For information, you can see him or Dan Fitzpatrick.

Mr. Steigerwald said he noticed there was a proposed mark in the governor's budget for DCNR and asked if that was to finish the LiDAR in PA. Mr. Jesperson said what was funded this year is the quality control for the LiDAR collected in 2006 for the western third of the state, full production and quality control of the central third of the state, and LiDAR and imagery for the entire eastern third of the state. The money for the processing and quality control is unclear at the moment. Following completion, PA will have data gathered that is consistent statewide.

J. Next Meeting

The next meeting was scheduled for Wednesday, May 7, 2008 at 10:00 am.

**FLOOD ADVISORY COMMITTEE
ATTENDANCE**

February 6, 2008

NAME	AGENCY
AHNERT, Peter	National Weather Service (NWS)
BURD, Dave	Lambertville Office of Emergency Management (OEM)
CABRERA, Reggina	NWS Eastern Region Headquarters (ERH)
COLVIN, Mary	Federal Emergency Management Agency (FEMA) Region II
DOUGLASS, Bill	Upper Delaware Council
FERRARI, Mark	N.Y. State Emergency Management Office
FITZPATRICK, Dan	Pa. Department of Community and Economic Development
GARLITZ, Skip	Stakeholder
GOULD, A. Chris	N.J. Department of Environmental Protection (DEP), Dam Safety and Flood Control
HAINLY, Bob	U.S. Geological Survey (USGS) – Pa.
HOGAN, Rachel	Nurture Nature Center
JESPERSON, Eric	Pennsylvania Mapping and Geographic Information Consortium
KINDLE, Ian	Environmental Education, Pa. Parks/Department of Conservation and Natural Resources (DCNR)
LEAR, Kathy	N.J.– OEM
MAHOOD, Jeff	Natural Resources Conservation Service (NRCS)
MARTINEZ, Vidal	National Park Service (NPS)
MCCARTNEY, Frank	Delaware River Joint Toll Bridge Commission
MCKILLOP, George	NWS – ERH
MOYLE, John	N.J. DEP
MUSZYNSKI, William	Delaware River Basin Commission (DRBC)
NECHAMEN, Bill	N.Y. Department of Environmental Conservation
PLACER, Katrina	Mercer County Planning
REISER, Robert	USGS
RIMAWI, Hani	Medina
RUGGERI, Joseph	N.J. DEP
RUPERT, Clarke	DRBC

SAFAFAR, Senobar	New York City DEP
SCHAFFNER, Mike	NWS
SCHULTZ, Sandra	NPS
SCORDATO, John	N.J. DEP
STANLEY, Jane	Nurture Nature Foundation
STEIGERWALD, Scott	Pa. DEP
SURO, Thomas	USGS – N.Y.
SZATKOWSKI, Gary	NWS
TAMM, Alan	Pa. Emergency Management Agency (PEMA)
TESSIERI, Laura	DRBC
TOBIN, Bonnie	Environmental Education, Pa. Parks/DCNR
TUDOR, Bob	DRBC
VAN ROSSUM, Maya	Delaware Riverkeeper
WESTFALL, Greg	NRCS
WILLIAMS, David	PEMA – Eastern Area
WINSLADE, C. William	Yardley Borough Manager & Emergency Management Coordinator
ZAGONE, Joseph	Department of Homeland Security – FEMA Region III